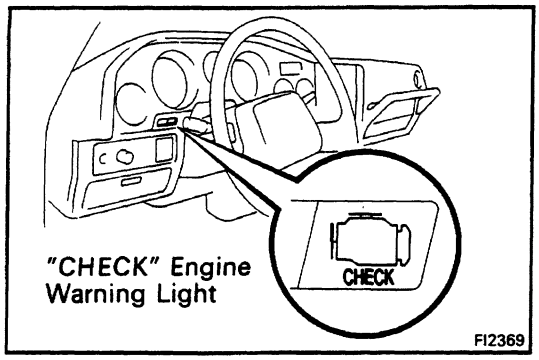
DIAGNOSIS SYSTEM

DESCRIPTION

The ECU contains a built–in self–diagnosis system by which troubles with the engine signal network are detected and a "CHECK" engine warning light on the instrument panel flashes.
By analyzing various signals as shown in the later tables (See pages FI–24, 25), the ECU detects system malfunctions which are related to the various operating parameter sensors or actuator. The ECU stores the failure code associated with the detected failure until the diagnosis system is cleared by removing the EFI fuse with the ignition switch OFF.
The "CHECK" engine warning light on the instrument panel informs the driver that a malfunction has been detected. The light goes out automatically when the malfunction has been cleared.

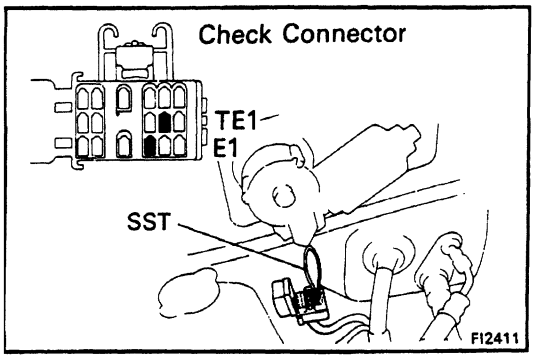


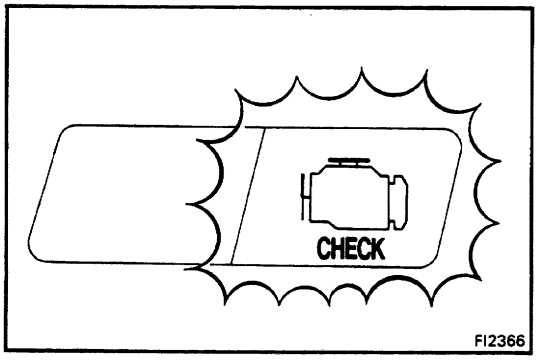
"CHECK" ENGINE WARNING LIGHT CHECK

1. The "CHECK" engine warning light will come on when the ignition switch is placed at ON and the engine is not running.
2. When the engine is started, the "CHECK" engine warning light should go out.
If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

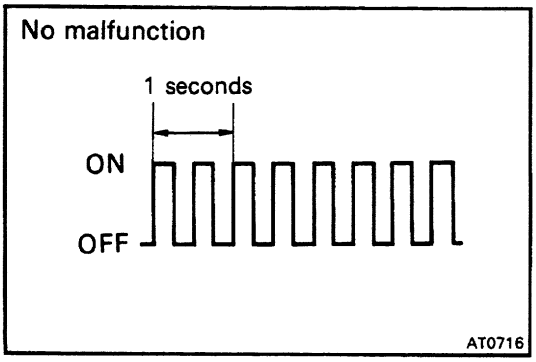
OUTPUT OF DIAGNOSTIC CODES

To obtain an output of diagnostic codes, proceed as follow:
1. Initial conditions
   (a) Battery voltage 11 volts or more
   (b) Throttle valve fully closed (throttle position sensor IDL points closed)
   (c) Transmission in neutral position
   (d) Accessories switched OFF
   (e) Engine at normal operating temperature
2. Turn the ignition switch to ON. Do not start the engine.
3. Using SST, connect terminals TE1 and E1 of the check connector.
   SST 09843–18020





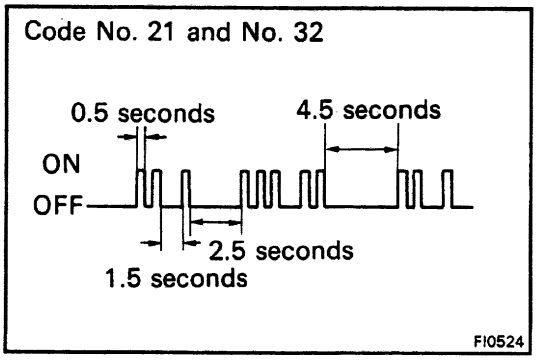
4. Read the diagnostic code as indicated by the number of flashes of the "CHECK" engine warning light.



Diagnostic Codes (See pages FI–24, 25)

(a) Normal System Operation (no malfunction)

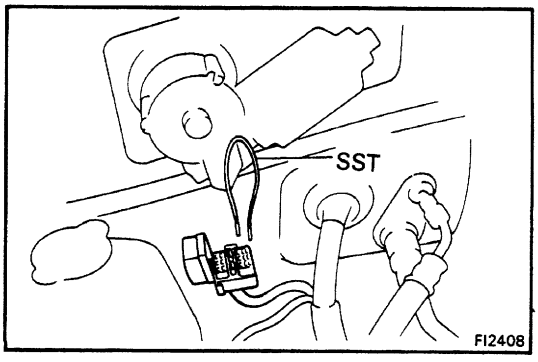
- The light will alternately blink ON and OFF 2 times per second.



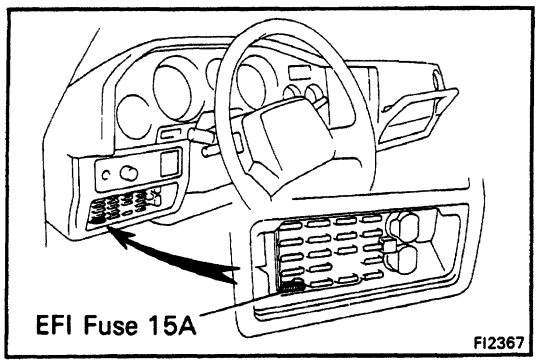
(b) Malfunction Code Indication

- In the event of a malfunction, the light will blink every 0.5 seconds. The first number of blinks will equal the first digit of a 2–digit diagnostic code and, after a 1.5 second pause, the 2nd number of blinks will equal the 2nd. If there are two or more codes, there will be a 2.5 second pause between each.
- After all the codes have been output, there will be a 4.5 second pause and they will all be repeated as long as the terminals TE1 and E1 of the check connector are connected.

HINT: In the event of a number of trouble codes, indication will begin from the smaller value and continue to the larger.



5. After the diagnosis check, remove SST.
SST 09843–18020



CANCELLING DIAGNOSTIC CODE

1. After repair of the trouble area, the diagnostic code retained in memory by the ECU must be cancelled out by removing the EFI fuse (15A) for 30 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.

HINT:

- Cancellation can also be done by removing the battery negative (–) terminal, but in this case, other memory systems (clock, etc.) will also be cancelled out.
- If the diagnostic code is not cancelled out, it will be retained by the ECU and appear along with a new code in the event of future trouble.
- If it is necessary to work on engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic code has been recorded.

2. After cancellation, road test the vehicle to check that a ”normal” code is now read on the ”CHECK” engine warning light.
   If the same diagnostic code appears, it indicates that the trouble area has not been repaired thoroughly.

DIAGNOSIS INDICATION

1. Including ”normal”, the ECU is programmed with the following 18 (Ex. California vehicles) or 19 (California vehicles) diagnostic codes.
2. When 2 or more codes are indicated, the lowest number (code) will appear first.
   However, no other code will appear along with code No.11.
3. All detected diagnostic codes, except code No–51, will be retained in memory by the ECU from the time of detection until cancellation.
4. Once the malfunction is cleared, the ”CHECK” engine warning light on the instrument panel will go out but the diagnostic code(s) remains stored in ECU memory (except for code No.51).

DIAGNOSTIC CODES

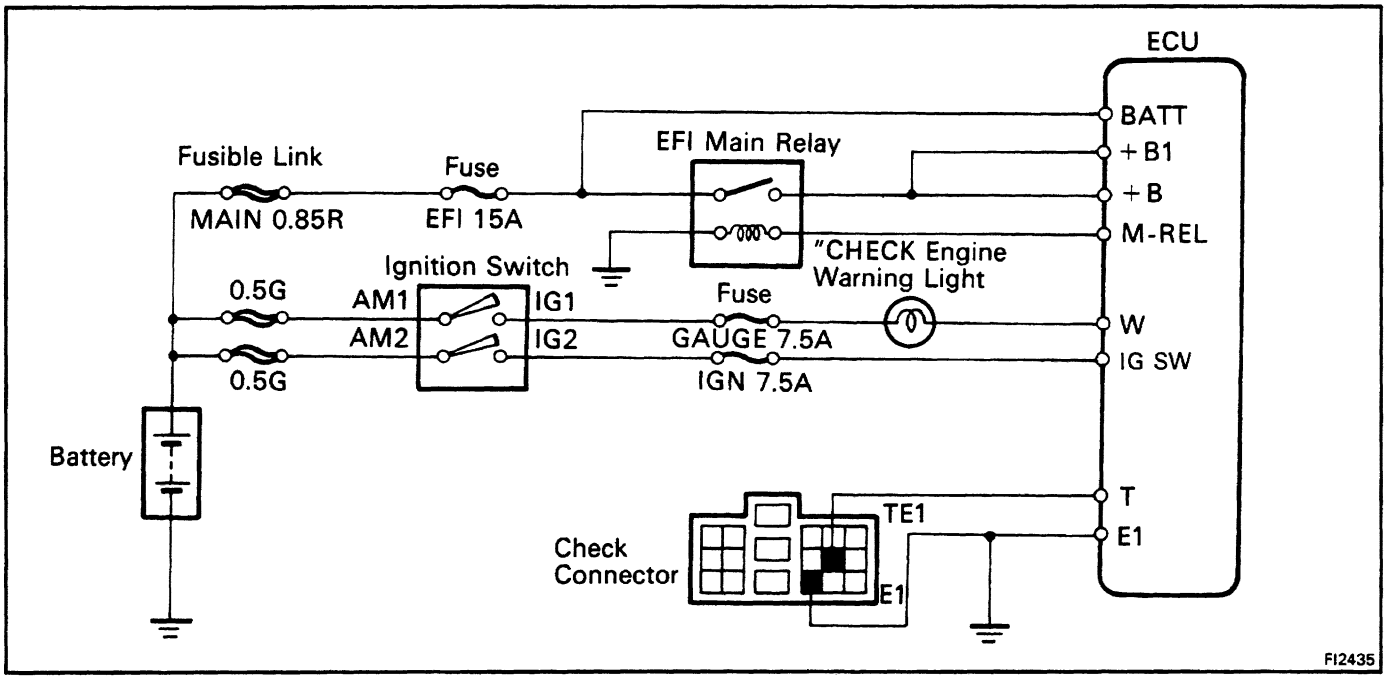
Code No.	Number of Check engine blinks	System	Diagnosis	Trouble area	See page
—	 FI1604	Normal	This appears when none of the other codes are identified.		—
11	 FI1605	ECU (+ B)	Momentary interruption in power supply to ECU.	• Ignition switch circuit • Ignition switch • Main relay circuit • Main relay • ECU	FI–30
12	 FI1606	RPM Signal	No "NE" or "G" signal to ECU within 2 seconds after engine has been cranked.	• Distributor circuit • Distributor • Starter signal circuit • ECU	IG–4
13	 FI1607	RPM Signal	No "NE" signal to ECU when engine speed is above 1,000 rpm.	• Distributor circuit • Distributor • ECU	–
14	 FI1608	Ignition Signal	No "iGF" signal to ECU 6 – 8 times in succession.	• Igniter and ignition coil circuit • Igniter and ignition coil • ECU	FI –41
21	 FI1609	Oxygen Sensor Signal	During air–fuel ratio feedback correction, voltage output from the oxygen sensor does not exceed a set value on the lean side and the rich side continuously for a certain period.	• Oxygen sensor circuit • Oxygen sensor • ECU	FI –44
		Oxygen Sensor Heater Signal	Open or short circuit in oxygen sensor heater.	• Oxygen sensor heater circuit • Oxygen sensor heater • ECU	
22	 FI1610	Water Temp. Sensor Signal	Open or short circuit in water temp. sensor signal.	• Water temp. sensor circuit • Water temp. sensor • ECU	FI–37
24	 FI1611	Intake Air Temp. Sensor Signal	Open or short circuit in intake air temp. sensor signal.	• Intake air temp. sensor circuit • Intake air temp. sensor • ECU	FI–36
25	 FI2562	Air–fuel Ratio Lean Malfunction	(1) When air–fuel ratio feedback compensation value or adaptive control value continues at the upper (lean) or lower (rich) limit. (2) When air–fuel ratio feedback compensation value or adaptive control value feedback frequency is abnormally high during feedback condition. H I NT: For condition (2), neither a lean (Code No. 25) nor a rich (Code No. 26) diagnosis is displayed consecutively.	• Injector circuit • Injector • Fuel line pressure • Air flow meter • Air intake system • Oxygen sensor circuits • Oxygen sensors • Ignition system • ECU	—
26	 FI2563	Air–fuel Ratio Rich Malfunction		• Injector circuit • Injector • Fuel line pressure • Air flow meter • Cold start injector • ECU	—

DIAGNOSTIC CODES (Cont'd)

Code No.	Number of Check engine blinks	System	Diagnosis	Trouble area	See page
28	 FI2698	No. 2 Oxygen Sensor Signal No. 2 Oxygen Sensor Heater	Same as code No. 21	Same as code No. 21	FI–44
31	 FI1612	Air flow Meter Signal	Open circuit in VC signal or short circuit between VS and E2 when idle contacts are closed.	• Air flow meter circuit • Air flow meter • ECU	FI–35
32	 FI1613	Air Flow Meter Signal	Open circuit in E2 or short circuit between VC and VS.	• Air flow meter circuit • Air flow meter • ECU	FI–35
35	 FI2699	HAC Sensor Signal	Open circuit in altitude compensation sensor signal.	• ECU	—
41	 FI1614	Throttle Position Sensor Signal	Open or short circuit in throttle position sensor signal.	• Throttle position sensor circuit • Throttle position sensor • ECU	FI–33
42	 FI1615	Vehicle Speed Sensor Signal	No "SPD" signal for 8 seconds when engine speed in between 2,000 rpm and 5,000 rpm and coolant temp. is below 80°C (176°F) except when racing the engine.	• Vehicle speed sensor circuit • Vehicle speed sensor • ECU	
43	 FI1616	Starter Signal	No "STA" signal to ECU until engine speed reaches 800 rpm with vehicle not moving	• Ignition switch circuit • Ignition switch • ECU	FI–39
*71	 FI2622	EG R System Malfunction	EG R gas temp. below predetermined level during EGR operation.	• EGR valve • EGR hose • EGR gas temp. sensor circuit • EGR gas temp. sensor • VSV for EG R • VSV circuit for EGR • ECU	FI–45
51	 FI1617	Switch Condition Signal	No "IDL" signal, "NSW" signal or "A/C" signal to ECU, with the check terminals E1 and TE1 shorted.	• A/C switch circuit • A/C switch • A/C amplifier • Throttle position sensor circuit • Throttle position sensor • Neutral start switch • Neutral start switch • Acceleration pedal and cable • ECU	—

California vehicles only

INSPECTION OF DIAGNOSIS CIRCUIT



1.
- Does "CHECK" engine warning light come on when ignition switch is at ON? — YES → System Normal
- NO → Does "CHECK" engine warning light come on when ECU terminal W is grounded to the body? — YES → Check wiring between ECU terminal E1 and body ground. — OK → Try another ECU.
- Check wiring between ECU terminal E1 and body ground. — BAD → Repair or replace.
- NO → Check bulb, fuse and wiring between ECU and ignition switch.
- BAD → Repair or replace.

2.
- Does "CHECK" engine warning light go off when the engine is started? — YES → System Normal
- NO → Check wiring between ECU and "CHECK" engine warning light. — BAD → Repair.
- OK → Is there diagnostic code output when check connector terminals TE1 and E1 are connected? — NO → Check wiring between ECU terminal T and check connector terminal TE1, and ECU terminal E1 and check connector terminal E1
- Check wiring between ECU terminal T and check connector terminal TE1, and ECU terminal E1 and check connector terminal E1 — OK → Try another ECU.
- YES → Does "CHECK" engine warning light go out after repair according to malfunction code? — NO → Further repair required.
- YES → System 0K → Cancel out diagnostic code.